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TRADE AND DEVELOPMENT BOARD
Committee on Commodities
Ad hoc Review Meeting on Bauxite
Geneva, 13 May 1991
Item 3 of the provisional agenda

DISCUSSION OF ISSUES FOR IMPROVED PRODUCER-CONSUMER CO-OPERATION

# Recycling of aluminium cans: environmental and economic aspects

by Mr. Rolf Andersson

The attached paper is being made available to the Ad hoc Review Meeting on Bauxite, in the original language version.

The views expressed are those of the author and do not necessarily reflect those of the UNCTAD secretariat. The terminology used is that of the author.

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# RECYCLING OF ALUMINIUM CANS ENVIRONMENTAL AND ECONOMIC ASPECTS

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## SUMMARY

Five years ago a recycling system for aluminium cans was introduced in Sweden. Svenska Returpack AB, a limited company, was founded and a special permit was issued by the Government to give the company the right to operate the recycling system. Last year the Swedish Government and Sweden's brewing industry decided to introduce a new refillable PET bottle in 1991. A recycling system for PET bottles has been tested 1988 on a small scale.

An investigation has been carried out into the energy consumption and environmental impacts of different packaging systems.

The paper will cover energy demand, environmental issues and economic questions. The recycling system for aluminium cans has achieved a high recycling rate of 83.3%. Swedish legislation and support from the Swedish Government are important factors in achieving this high reycling rate. A high deposit also produced a high return rate. A great many marketing activities have been carried out to improve environmental consciousness among consumers


## INTRODUCTION

The packaging system used today in the Swedish brewery and soft drinks industry employs components and methods that have been successfully developed over a long period of time, to conform with requirements and demands as they arise. Some examples of the changes that have occurred and which have necessitated modifications to the system are:

A. Government demand for a packaging system to save energy and be environmentally friendly.

B. Consumer demand for a packaging system with non-breakable lightweight packaging.

C. The package should protect the product (soft drink or beer) from damage.

D. Working environment aspects should be an important consideration.

During the last ten years the various packaging systems have been through different development phases.

Resolution on recycling for aluminium cans

On May 18, 1982, Riksdagen (the Swedish Parliament) passed a bill on the recycling of aluminium cans under which at least 75% of all cans were to be recycled by 1985. One result was that a deposit was introduced for aluminium cans for beer and soft drinks.

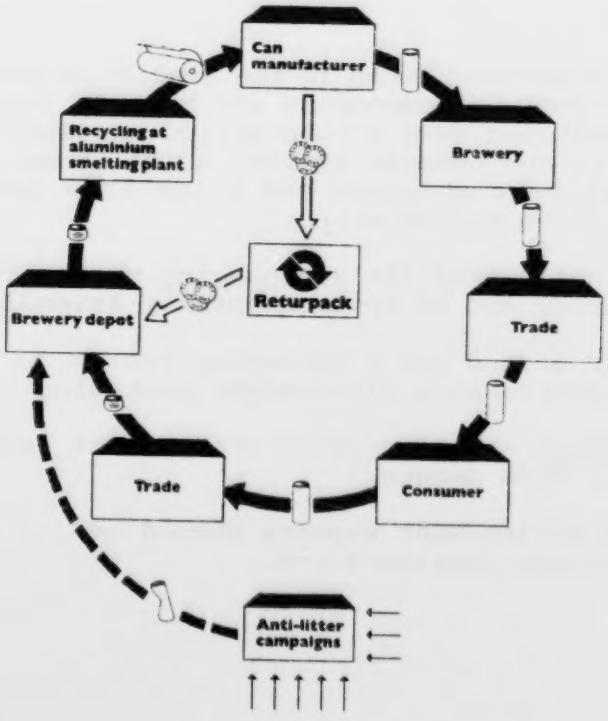
Responsibility for recycling

A special company, AB Svenska Returpack, is responsible for developing, coordinating and administrating the collection and deposit system. The recycling system is operated in compliance with special permission issued by the Government and based on an Act of Parliament. AB Svenska Returpack, which is jointly owned by the breweries, the retail trade and the packaging industry, has been granted this permission.

Recycling system for aluminium cans

A recycling system for aluminium cans was introduced in Sweden in 1984. The recycling rate has been raised over the last six years from 60% to the current figure of 83%. The recycling system for aluminium cans is described in Figure 1. All the cans collected by this system are used for the manufacture of new aluminium cans.

Fig. 1



## The deposit system

The deposit system includes all aluminium cans for beer and soft drinks. The can manufacturer or drink importer charges a deposit on all returable cans which are delivered within the country and settles with Returpack. The deposit then follows the returnable can through each stage from the brewery and retailer to the consumer. The consumer gets the deposit back when the returnable cans are handed at a reception point, normally the retailer. The brewers collect the cans and take them back to the brewery, pay the deposit to the retailer and receive the corresponding sum from Returpack. The cans are then compacted, loaded and delivered to the aluminium smelting plant which then manufactures new can material from the scrap. Returpack receives payment for the UBC (used beverage containers). Returpack pays a handling fee to the breweries and retailers.

## Contributing to "Keep Sweden Tidy"

The deposit system for aluminium cans generates resources for general environmental purposes. One Swedish öre from each can is allocated to measures for increased can recycling, anti-litter campaigns or other similar environmental purposes. If 850 million cans are sold a year in Sweden, the amount allocated for environmental purposes will be SEK 8.5 million annually Returpack and the National Swedish Environment Protection Board decide on how the money is to be used.

## Refillable glass bottles

The refillable glass bottle system in Sweden has been improved by the introduction of a new crate. Weight has been cut by reducing the number of bottles in the crate from 24 to 20 bottles. At the same time, a study has been carried out with the aim of reducing the weight of the bottle from 300 to 250 grammas.

## Recycling system for PET bottles

A recycling system for PET bottles has been tested on a small scale in 1988 using the same principle as that employed for cans.

## Refillable PET-bottles

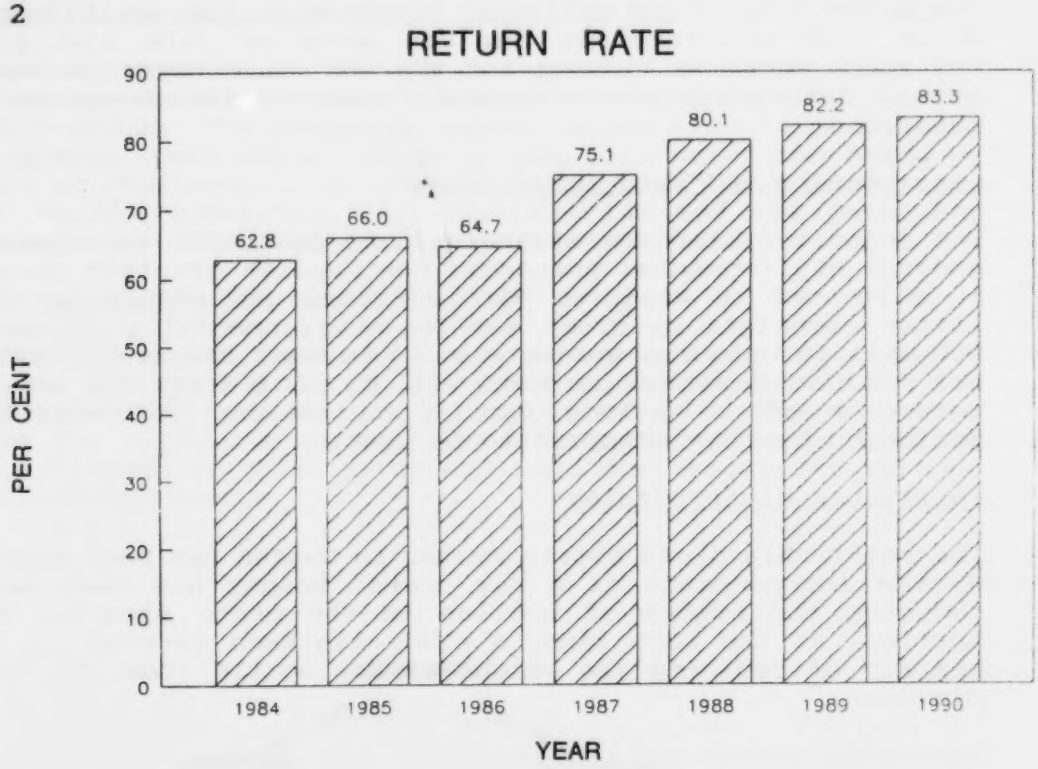
The brewing industry and the Swedish Government, have jointly decided to introduce a refillable PET bottle system in Sweden. The main reason for making this decision was a study carried out by Gustav Sundström of Miljöbalans AB which indicated that refillable PET bottles save energy and that the system is more environmentally-friendly than a recycling system for PET bottles.

## 3. RECYCLING RATE FOR ALUMINIUM CANS

When the system was introduced in Sweden the project group set the deposit at 25 öre per can.

But this deposit was insufficient achieve the 75% target set by the Government. On 17 March 1987 the Returpack Board and the Government jointly decided to increase the deposit to 50 öre per can. From 1987, the return rate has exceeded 75%, as shown in Figure 2.

Fig. 2




## 4. BACKGROUND TO THE HIGH RECYCLING RATE

There are many reasons why the Swedish can system is able to achieve a high return rate.

Ownership is very important if the recycling system is to be efficient and this is the main reason for retailer participation in the system.

The owners' of Returpack are the brewery industry, the packaging company (PLM) and the retailers.

All the cans are collected from retail outlets, either by means of reverse vending machines or manually in the case of the smaller shops.

The breweries collect the cans and control the number of cans and process them into flattered cans in the breweries.

Returpack is responsible for the transportation of the cans from the breweries to the smelting plant.

Returpack pays a handling fee of 11 öre per can to the retailer and 6.6 öre per can to the brewery.

Parliamentary legislation has been of great importance in supporting the recycling system. And support from the Swedish Government and the National Swedish Environment Protection Board has been an important factor in Returpack's efforts to achieve a high recycling rate.

In June 1990, the Swedish Government passed a new law requiring Returpack to achieve a 90% return rate by 1993.

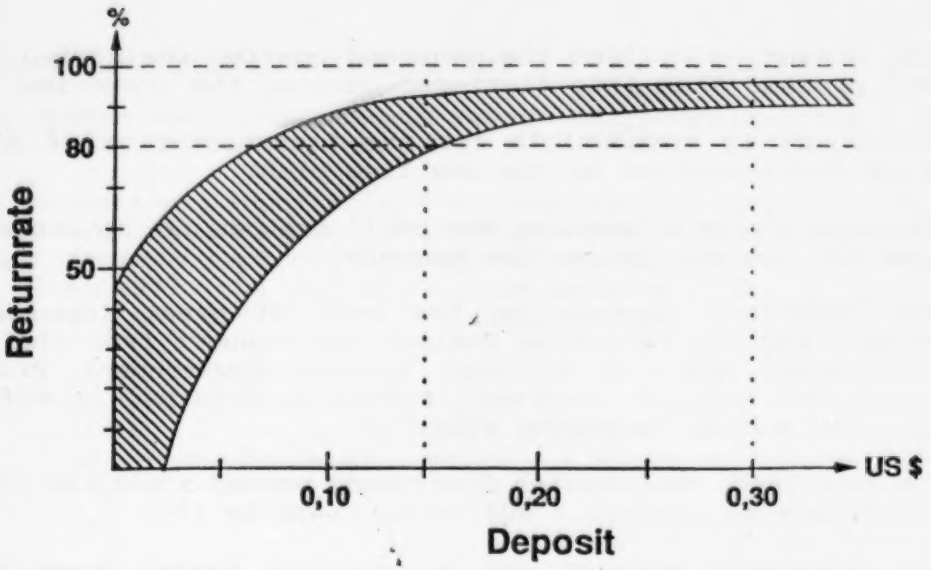
To guarantee success for a reycling system such as that operated by Returpack, it is essential to have the support of the Government and the "environmentalists". When the Returpack system was being introduced, the environmentalists containally opposed Returpack's goals, initially mainly due to litter problems and later because it was claimed that the system made excessive energy demands for the remelting of the cans. Several studies have been made concerning energy demand and, the environmental effects of aluminium can recycling system. We have finally been able to convince most environmentalists to accept the system after achieving a high recycling rate. But there still are some questions about destroying rainforest when mining bauxite. After studing this area Returpack are convinced of the awareness and the willness of the mining companies to protect the environment. We have also studied the Australian mining companies efforts to achieve new forest growths after

Returpack spent SEK 5 million per year in advertising to increase consumers' environmental consciousness . In the last two years, leading Swedish entertainment artiste and politicians have supported Returpack by participating in such campaigns. We consider that these campaigns were one of the most important reasons for achieving an 83.3% return rate in 1990.

The importance of a high deposit is shown in Figure 3. We think that it is impossible to achieve a high return rate without a deposit system. Different return systems have been tried in other countries:

- Voluntary return with delivery to special reception centres
- Sorting at source, with households using several different containers
- Deposit arrangements, with re-delivery through retailers or special reception centres

Fig. 3




Experience from voluntary arrangements, based on campaigns to motivate people to take empty containers to special reception centres, shows very low return levels. Without cash incentives or penalty schemes, it has not been possible to document return percentages in excess of 40%.

Sorting at source (curbside collection) is being tested in a number of different places around the world and is expected to make an important contribution to environmental and resource conservation. At the present time it is possible to draw a number of important conclusions with regard to the return percentage, which has been shown to vary greatly depending on:

- Housing type (detached houses compared to apartment blocks)
- Social status
- Motivation campaigns
- Penalties

The best results, with a return percentage of 60-70%, have been obtained in residential districts with detached houses occupied by higher social groups, supported by comprehensive motivation campaigns and fines for incorrectly sorted materials.

On the other hand, no system has been demostrated which functions in densely populated urban areas.

Furthermore, and perhaps most important, neither reception centres nor sorting at source will reduce visible pollution in the countryside, etc, which is largely the result of outdoor activities.

Experience indicates that, if a sufficiently high deposit is charged on empty containers, they will not be left lying in the country for long.

## 5. ENERGY DEMANDS OF DIFFERENT PACKAGING SYSTEMS

The calculation of energy demands for different packaging systems cover all steps from raw materials to waste processing and disposal. The calculation is done in steps so that it is possible to use a model to develop the system to achieve reduced energy demands and less environmental impact on the environment.

The result of the calculation for energy demands is shown in Figure 4.

Fig. 4 Existing packages

| | Mj/l |
|---|---|
| 33 cl white glass, 30 trips | 2.9 |
| 33 cl green glass, 30 trips | 3.3 |
| 100 cl glass, 10 trips | 3.3 |
| 45 cl aluminium can, 82% return rate | 3.3 |
| 150 cl PET one-way | 4.9 |

After development work and the introduction of refillable PET bottles, almost all one-way packages will disappear from the Swedish market, and packaging in 1993 will mainly consist of the following systems (Figure 5). The energy demands for the different system are also shown.

Fig. 5 Packages under development

| | Mj/l |
|---|---|
| 150 cl PET, 10 trips | 2.3 |
| 33 cl white, lighter returnable glass | 2.8 |
| 45 cl aluminium can, 90% return rate | 2.9 |
| 33 cl green, lighter returnable glass | 3.2 |

If different packaging system are to be developed, it is important to take into consideration the energy demands for different steps in the system. Special attention has been given to energy demands, distribution, and the question of whether to use crates or cartons. Another important factor has been the energy demands for cleaning refillable bottles.

The energy demands for the different steps are shown in Figures 6, 7, 8, 9, 10, 11 and 12.

Fig. 6

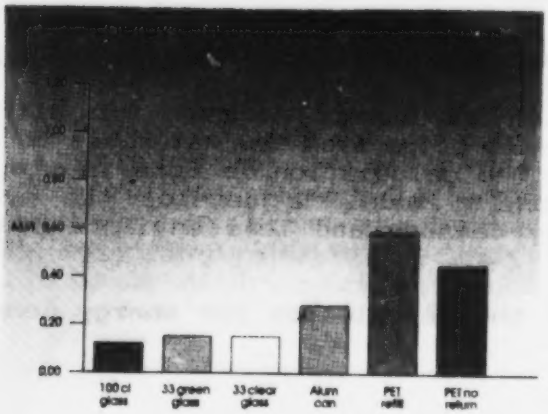



Fig. 7

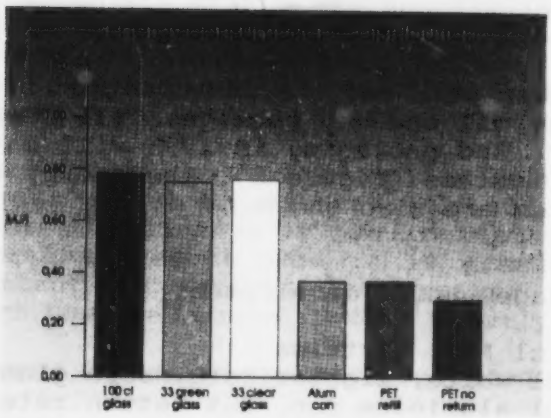



Fig. 8

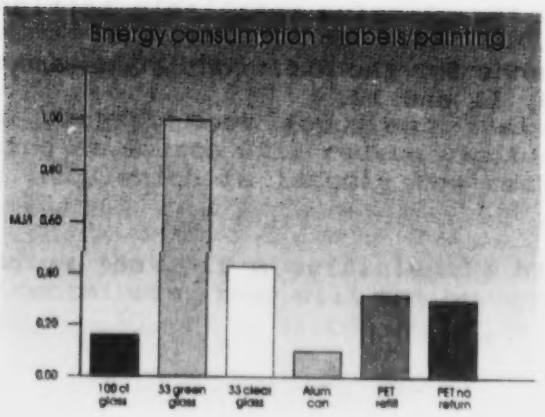


Fig. 9

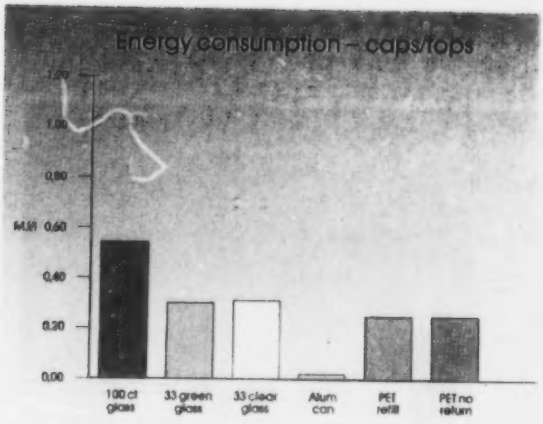



Fig. 10

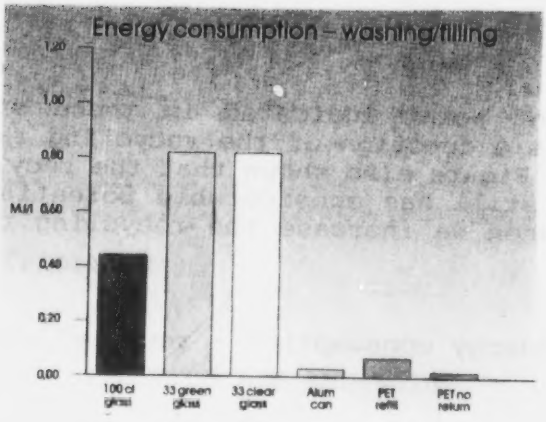



Fig. 11

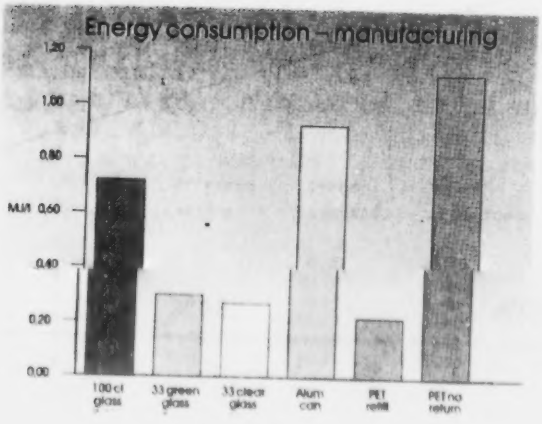
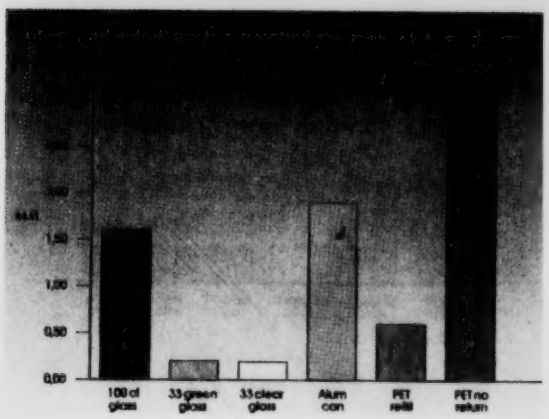
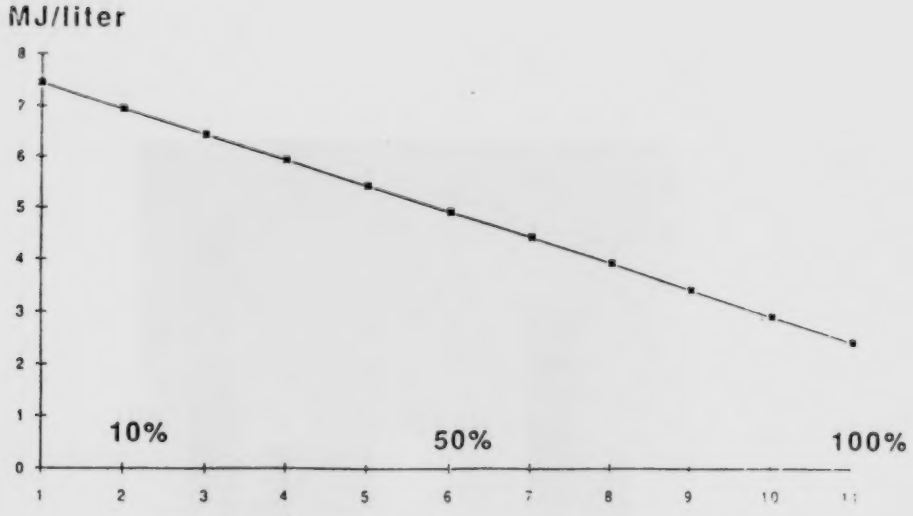


Fig. 12



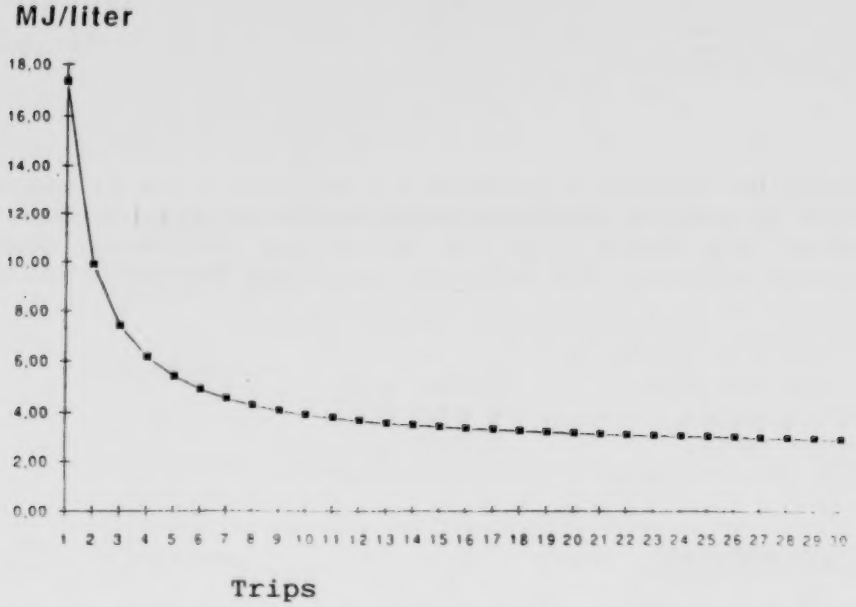

A very important point indicated in these studies is that energy demand is a function of the recycling rate as shown in Figure 13. This Figure also shows that the recyling system for aluminium cans still has considerable potential for reducing energy demand when we increase the recycling rate to 90% and even higher.

Fig. 13 Energy consumption - recycled can



For the refillable glass bottle we have already reached the limit as shown in Figure 14 and we cannot reduce energy demand by increasing the number of trips above 30 trips.

Fig. 14 Energy consumption - white refillable glass bottle




## 6. ENVIRONMENTAL EFFECT ON AIR AND WATER

All packaging systems will affect the environment in some way. For example the manufacture of cans and PET bottles has a higher impact on the environment than the manufacture of refillable glass bottles, but on the other hand the distribution of glass bottles has a higher environmental impact. The environmental impact on air and water is shown in Figures 15 and 16.

Fig. 15 Emissions into the air (grams/litre, number of trips and recycling rate)

| | Dust | Sulphur oxides | Nitrogen oxides | Carbon monoxide | Hydro chlorides | Hydro carbons |
|---|---|---|---|---|---|---|
| 33 cl w glass | 0.13 | 1.21 | 1.32 | 0.32 | 0.01 | 0.24 |
| 33 cl g glass | 0.14 | 1.73 | 1.32 | 0.29 | 0.01 | 0.22 |
| 100 cl glass | 0.17 | 1.32 | 1.66 | 0.42 | 0.01 | 0.31 |
| 45 cl can | 0.52 | 2.88 | 1.62 | 0.29 | 0.00 | 0.51 |
| 150 cl PET-o | 0.16 | 2.11 | 1.68 | 0.30 | 0.01 | 0.23 |
| 150 cl PET-r | 0.11 | 1.76 | 1.03 | 0.37 | 0.00 | 0.62 |

Fig. 16 Emissions into water (grams/litre, number of trips and recycling rate)

| | Dissolved pollutants | Suspended materials | Biochemical oxygen consumption | Chemical oxygen consumption | Other metal ions | Hydro carbons |
|---|---|---|---|---|---|---|
| 33 cl w glass | | 0.05 | 0.34 | 0.33 | 0.07 | 0.07 |
| 33 cl g glass | | 0.05 | 0.34 | 0.34 | 0.07 | 0.07 |
| 100 cl glass | | 0.05 | 0.34 | 0.33 | 0.07 | 0.07 |
| 45 cl can | 0.03 | | 0.02 | 0.40 | | |
| 150 cl PET-o | 0.37 | 0.08 | 0.23 | 0.57 | 0.02 | |
| 150 cl PET-r | 0.07 | 0.09 | 0.24 | 0.60 | | |

## 7. WASTE

Swedish households currently produce 2.6 million tons of waste per year. The breweries produce only 0.8% of this amount. Figure 18 shows how waste from the breweries is broken down interms of glass bottles, PET bpttles, caps and non-returnable cans.

Fig. 17

| | |
|---|---|
| Glass-bottles | 12,000 tons |
| PET-bottles | 6,000 tons |
| Caps, metal | 2,500 tons |
| Non return cans | 2,000 tons |

## 8. WORKING ENVIRONMENT

The most important factors related to brewery products are the lifting of heavy goods, noise, cuts from glass and the risk of explosions.

During the last few years, changes have taken place in the brewing industry distribution system. Shifting from manual order picking to mechanised order picking has reduced lifting work in distribution and in the order picking area. Changing over to materials such as aluminium and PET has reduced the risk of explosions and cuts. Light-weight packaging such as aluminium cans and PET bottles has also reduced heavy lifts in the retail shops.

## 9. ECONOMIC ASPECTS

As shown in Figure 18, the main revenue for Returpack AB is the deposit from not returned cans which are not returned and the revenue from the scrap obtained from used beverage containers.

The handling fees paid to retailers and breweries are the main costs for the system. Marketing costs are also a significant item in the budget for 1991.

The break even for the system occurs at a return rate of about 75%. Returpack charges 5 öre in administration costs for each can sold in Sweden to achieve a zero result for the year.

When a deposit system for beverage containers was introduced the industry was afraid of losing market shares. Experience from the Swedish deposit system for aluminium cans shows that the system has been a success and also that the cans have won increased market shares (Fig. 19).

Fig. 18

**AB SVENSKA RETURPACK BUDGET 1991**
SEK MILLION
IF 860 MILLION CANS SOLD
IF RETURN RATE 85 %

| | | |
|---|---|---|
| **REVENUE** | | |
| DEPOSIT REVENUE | 344.0 | |
| ADMINISTRATIVE CHARGES | 43.0 | |
| IMPORT FEE | 1.2 | |
| SCRAP REVENUE | 57.8 | 446.0 |
| **COST** | | |
| DEPOSIT EXPENSES | 290.9 | |
| HANDLING FEE RETAILERS | 80.0 | |
| HANDLING FEE BREWERIES | 48.0 | |
| STEEL CANS | 2.2 | |
| FREIGHT AND CONTAINER RENT | 7.0 | |
| MARKETING | 9.2 | |
| CONTRIBUTION TO "KEEP SWEDEN TIDY" | 8.6 | |
| ADMINISTRATION | 6.4 | 452.3 |
| FINANCIAL RESULT | | -6.3 |
| INTEREST NET | | 6.0 |
| NET FINANCIAL RESULT FOR THE YEAR | | 0.0 |

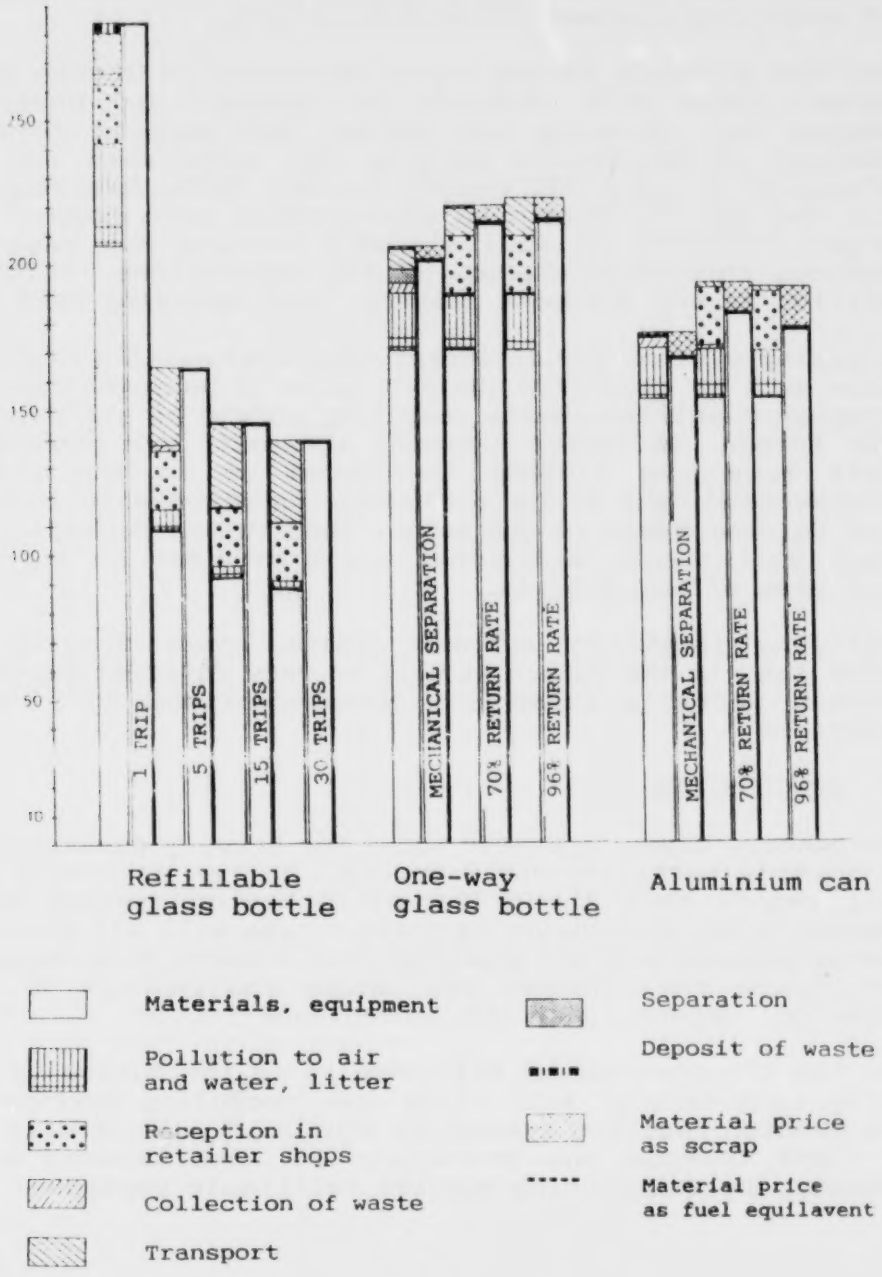
Fig. 19

Development of the Swedish market

| Year | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|
| Beer and soft drinks sold in Sweden (million liter) | 689 | 696 | 753 | 817 | 855 | 936 | 1010 | 1047 |
| Cans sold (million) | 600 | 607 | 645 | 698 | 734 | 772 | 830 | 843 |
| Return rate (%) | 0 | 63 | 66 | 65 | 75 | 80 | 82 | 83 |
| Can share of the beer market % | 54 | 55 | 55 | 56 | 57 | 59 | 60 | 60 |

The Board for Technical Development carried out a study in National 1979 of the cost of different packaging systems. The results are presented in Figure 20.

Fig. 20 Cost of beer and soft drink packaging



## 10. POLITICAL ASPECTS OF PACKAGING SYSTEMS

The Government of a country can protect its brewing industry by introducing special refillble systems and banning one-way and/or recycling systems. At the moment there is a trend towards introducing advanced refillable systems. Denmark has banned cans, but exports of cans to Germany and Sweden. Norway and Finland have very high taxes on one-way packages, and both countries are considering introducing refillable PET bottles and recycling systems for aluminium cans.

When the European market makes decisions on future packaging system, there will probably be economic and environmental reasons for choosing one system and banning others. The question of ecological balance for returnable and one-way bottles in a joint EEC market without trade barriers arises. Will the one-way bottle be ecologically more compatible with larger distances or will standard bottles and cases be introduced throughout Europe by EEC regulations, which can be refilled in any European brewery, this avoiding dead freight?

Recycling systems for different containers with a high material value such as aluminium and PET, have to be established in all European countries. Waste recycling should be standardized all over Europe. Different national interests and procedures for waste recycling already introduced or in the process of introduction have so far prevented concerted solutions throughout Europe. There is the danger that future packaging limitations will create additional trade barriers in Europe which will also affect exports.

Employing recycling systems creates open trading between countries. In the future it will be very interesting to see the Eurpean market's rules and recommendations for its member countries.

## 11. CONCLUSIONS

The general trend in Sweden today for brewery packaging systems is towards refilling and recycling. It has also been shown in this report that the different packaging systems which the Swedish brewing industry is going to use will all have the same energy consumption and environmental impact. This means that in the future the consumer can choose the package to suit the occasion, depending on the convenience factor.

How the European market will develop in the future is particularly interesting. Will it be open recycling systems such as the Swedish recyling system for aluminium cans or will there be a trend towards the protection of each country's brewing industry by introducing special refillable packages?

24 April 1991

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Geneva, 13 May 1991
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# DISCUSSION OF ISSUES FOR IMPROVED PRODUCER-CONSUMER CO-OPERATION

## Promoting the use of aluminium products and developing aluminium fabricating facilities in developing countries and regions

Prepared by the
International Bauxite Association Secretariat

The attached paper is being made available to the Ad hoc Review Meeting on Bauxite, in the original language version.

The views expressed are those of the author and do not necessarily reflect those of the UNCTAD secretariat. The terminology used is that of the author.

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# Promoting the use of aluminium products and developing aluminium fabricating facilities in developing countries and regions

(Prepared by IBA Secretariat for UNCTAD Meeting of Bauxite Producers and Consumers)

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# PROMOTING THE USE OF ALUMINIUM PRODUCTS AND DEVELOPING ALUMINIUM FABRICATING FACILITIES IN DEVELOPING COUNTRIES AND REGIONS

## INTRODUCTION

1. This paper has three basic objectives. The first is to sketch the background to the broad issue of promotion of aluminium consumption. The second is to outline the steps taken by the International Bauxite Association (IBA) in collaobration with United Nations organizations to address the issue and the third objective is to give a progress report from IBA's perspective on work done so far with regard to the issue.

## BACKGROUND

2. Major structural adjustments have occurred in the aluminium industry over the past 20 years, due to reduced growth rates in aluminium consumption and to significant increases in energy costs in the main industrial markets.

3. In the 1960s aluminium consumption grew at annual rates of 10 per cent or more. In the 1980s these rates had fallen to just over 1 per cent. Today's long-term projections are for annual rates of growth of 2-3 per cent. The causes of this decline include lower rates of growth of world industrial production, increased competition from substitute materials, increased recycling and downsizing of products (i.e. using less aluminium per product).

4. Accompanying the decline in the growth rate in aluminium consumption has been the major increase in energy costs (alluded to earlier) following the oil crisis of 1973 and 1979. The increase of energy costs, more specifically power costs, has led to the increase in cost of producing primary aluminium significantly in traditional producing regions viz Japan, United States and Europe. Over the past 15 years or so, the share of production coming from these traditional producers has declined dramatically in favour of new producers with relatively cheap sources of power in Australia, Brazil, Canada, Norway, Venezuela and certain Middle Eastern countries. The structural adjustments that have occurred in the industry have adversely affected suppliers of bauxite and alumina to traditional markets, since many of the new producers of primary aluminium have also utilized local sources of bauxite and alumina.

5. One of the strategic responses of IBA to these structural changes has been to seek to promote aluminium consumption "especially in member countries, regional groupings to which member countries belong and in other areas with low per capita aluminium consumption as a means of increasing demand for bauxite, alumina and aluminium from IBA member countries". It may be noted in passing that the view that there is potential for the expansion of aluminium consumption in developing regions of the world has been expressed on several occasions by aluminium company officials looking for solutions to the problem of low growth in the traditional markets.

6. An additional element of the overall strategy of the IBA has been to create "conditions to foster forward integration, where feasible, of the bauxite industry in member countries based on the beneficial exploitation of

energy and bauxite resources in IBA member countries". This strategy is cognizant of the fact that whilst the growth rate of consumption of primary aluminium has declined in the traditional markets the growth rates in the more advanced developing countries has been quite impressive.

## IBA'S EXPLORATORY WORK

7. Over the period 1985-1987, IBA Secretariat undertook preliminary but fairly substantive work[1/] in monitoring trends in consumption of aluminium particularly in developing countries. That work consisted, inter alia, of the following projects:

(i) Inventory of aluminium consumption in the developed and developing countries;[2/]
(ii) Changes in the competitive position of aluminium vis-à-vis its substitute materials;
(iii) A regional overview of the Aluminium Semis Industry.

8. The preliminary work indicated that:

- There is a close correlation between the living standard in a nation and the level of per capita aluminium consumption. However, it was recognised that the standard of living may not be the only determining factor; other factors such as Government policies towards the aluminium industry may be important as well.

- In the "new" markets, the so-called newly industrialised economies such as Taiwan Province of China, Singapore, Hong Kong, Republic of Korea, together with the oil-rich developing countries such as Saudi Arabia and Bahrain, have realized high per capita aluminium consumption levels, and future consumption levels are expected to be even higher. Similar findings are reached for some Latin American countries such as Brazil, Venezuela, Argentina and Mexico, where aluminium consumption per capita is expected to increase, since policies to solve these countries' economic problems have started to show their positive impact on these economies..

- The developing countries globally offer a large potential market for the so-called conventional aluminium products. Creating the right conditions in these countries could help the metal to gain further application in many market segments. This positive move can be strengthened by encouraging the production of aluminium products which are more suitable for the enhancement of economic development in these regions.

- The finding then was that the West African region seemed to be deficient in semi-fabricating facilities. A realistic aluminium consumption demand scenario suggested that by 1990 that region would remain in a deficient situation.

- An update of this situation is presented in table 2 below. The table indicates that the West African region is most likely to be deficient in aluminium processing capacity by the year 2000.

- In the ASEAN Group of countries, there has been a duplication of aluminium fabricating facilities, the rationalisation of which is now being undertaken by the Asean Aluminium Industry Club. Notwithstanding this duplication there are deficiencies in fabricating facilities in some countries in this region.

Table 1

Estimated 1990 aluminium consumption levels (1), selected countries

| | Region | Country | Population 1990 (million) | Per capita al. cons. (1990) lbs/cap. | Total aluminium cons. by region (kt) |
|---|---|---|---|---|---|
| CARIBB LATIN & CENTRAL AMERICA | CARIBBEAN | Anguilla | .007 | .05 | |
| | | Antigua & Barbuda | .076 | 0.8 | |
| | | Dutch Antilles | .282 | 1.5 | |
| | | Bahamas | .253 | 1.5 | |
| | | Barbados | .255 | 1.5 | |
| | | Cuba | 10.608 | 1.7 | |
| | | Dominica | .082 | 0.8 | |
| | | Dominican Rep. | 6.867 | 1.7 | |
| | | Grenada | .085 | 0.5 | |
| | | Haiti | 6.263 | 0.2 | |
| | | Jamaica | 2.520 | 1.3 | |
| | | Puerto Rico | 3.480 | 1.8 | |
| | | St. Kitts-Nevis | .044 | 0.8 | |
| | | St. Lucia | .150 | 0.6 | |
| | | Trinidad & Tobago | 1.281 | 3.5 | |
| | | Martinique | .341 | 0.8 | |
| | | St. Vincent & Grenadines | .116 | 0.5 | |
| | CENTRAL AMERICA | Belize | .187 | 1.1 | |
| | | Costa Rica | 3.015 | 2.5 | |
| | | El Salvador* | 5.252 | 0.7 | |
| | | Guatemala | 9.197 | 1.5 | |
| | | Honduras | 5.138 | 0.6 | |
| | | Mexico* | 99.598 | 3.3 | |
| | | Nicaragua | 3.871 | 0.5 | |
| | | Panama* | 2.418 | 4.6 | |
| | SOUTH AMERICA | Argentina* | 32.322 | 3.6 | |
| | | Bolivia | 7.314 | 1.0 | |
| | | Brazil* | 150.368 | 5.9 | |
| | | Chile | 13.173 | 2.2 | |
| | | Colombia | 32.978 | 1.3 | |
| | | Ecuador | 10.587 | 1.3 | |
| | | French Guiana | .098 | 1.5 | |
| | | Guyana | .796 | 0.8 | |
| | | Paraguay | 4.277 | 1.4 | |
| | | Peru | 21.550 | 1.1 | |
| | | Surinam | .422 | 1.5 | |
| | | Uruguay | 3.094 | 1.5 | |
| | | Venezuela* | 19.735 | 14.5 | |
| | | | | | 849.49 |

(1) Primary and secondary aluminium

Table 1 (cont'd)

| | Region | Country | Population 1990 (million) | Per capita al. cons. (1990) lbs/cap. | Total aluminium cons. by region (kt) |
|---|---|---|---|---|---|
| WEST AFRICAN | WEST AFRICA | Benin | 4.630 | 1.5 | |
| | | Burkina Faso | 8.996 | 0.3 | |
| | | Cameroon*(2) | 11.833 | 3.5 | |
| | | Cape Verde | .370 | 0.2 | |
| | | Gambia | .861 | 0.4 | |
| | | Ghana | 15.028 | 2.8 | |
| | | Guinea | 5.755 | 1.5 | |
| | | Guinea-Bissau | .964 | 0.5 | |
| | | Côte d'Ivoire | 11.977 | 4.5 | |
| | | Liberia | 2.575 | 0.3 | |
| | | Mali | 9.214 | 0.6 | |
| | | Mauritania | 2.024 | 1.5 | |
| | | Niger | 7.731 | 1.5 | |
| | | Nigeria | 108.542 | 4.8 | |
| | | Senegal | 7.327 | 2.0 | |
| | | Sierra Leone | 4.151 | 1.5 | |
| | | Togo | 3.531 | 0.5 | |
| | | | | | 328.82 |
| SOUTH ASIAN, SOUTH-EAST ASIAN PACIFIC | SOUTH ASIA | Bangladesh | 11.593 | 0.8 | |
| | | Bhutan | 1.516 | 0.7 | |
| | | India | 853.094 | 1.1 | |
| | | Maldives | .215 | 0.2 | |
| | | Nepal | 19.143 | 0.5 | |
| | | Pakistan | 122.626 | 0.6 | |
| | | Sri Lanka | 17.217 | 0.5 | |
| | SOUTH-EAST ASIA & PACIFIC | Brunei | .266 | 0.3 | |
| | | Cambodia | 8.246 | 0.3 | |
| | | China | 1,139.060 | 2.2 | |
| | | Fiji | .764 | 0.2 | |
| | | Indonesia | 184.283 | 0.7 | |
| | | Lao PDR | 4.139 | 0.2 | |
| | | Malaysia | 17.891 | 8.5 | |
| | | Myanmar | 41.675 | 0.2 | |
| | | Papua New Guinea | 3.874 | 0.2 | |
| | | Philippines | 62.413 | 0.5 | |
| | | Republic of Korea | 42.793 | 9.9 | |
| | | Samoa | .168 | 0.1 | |
| | | Singapore | 2.723 | 45.8 | |
| | | Taiwan Province of China | 19.263 | 8.5 | |
| | | Thailand | 55.702 | 0.5 | |
| | | Viet Nam | 66.693 | 0.2 | |
| | | | | | 10,283.62 |

(2) Cameroon is included because of its special relationship with this region

Table 1 (cont'd)

| | Region | Country | Population 1990 (million) | Per capita al. cons. (1990) lbs/cap. | Total aluminium cons. by region (kt) |
|---|---|---|---|---|---|
| OCEANIA | OCEANIA | Australia | 16.873 | 43.3 | |
| | | New Zealand | 3.392 | 26.1 | |
| | | | | | 354.7(3) |

Source: Updated from "Outline of Study in Collaboration with UNIDO and UNCTAD" on "Promoting the use of aluminium products, and developing aluminium fabricating facilities in developing countries and regions", IBA/EB/XLI/9/88.

(3) Figure based on statistics obtained from Metall Statistik, 1979-89.

* Represents countries with published per capita consumption figures.

Table 2

Forecast of regional capacity and demand for (semi) fabricated aluminium products in kty: 1995

(Demand scenario for the year 2000 in brackets)

| Region | Estimated 1990 capacity | Projected 1995 capacity | Estimated demand | | |
|---|---|---|---|---|---|
| | | | Low scenario | Realistic scenario | High scenario |
| Caribbean Latin and Central American | 1,452.0 | 1,853.1 | 1,083 (1191) | 1,137 (1308) | 1,252 (1565) |
| W. African | 173.8 | 221.8 | 365 (402) | 383 (440) | 422 (528) |
| South Asian Sout-East Asian and Pacific | 4,441.6 | 4,663.7 | 4,317 (4749) | 4,533 (5213) | 4,990 (6238) |
| Oceania | 646.9 | 679.2 | 446 (491) | 468 (538) | 516 (645) |

Sources: Revised and updated from paper titled: "Promoting the use of aluminium products and developing aluminium fabricating facilities in developing countries and regions". Document presented by the Secretary-General of IBA to UNCTAD and UNIDO, June/July 1987.

Revisions based on IBA estimates.

## SPECIFIC MARKET STUDIES: SCOPE OF WORK

9. The IBA proposed, following this broad exploratory work undertaken by its Secretariat, that specific market studies on regional bases be undertaken. It was envisaged that collaborative work could be undertaken by the IBA, UNCTAD and UNIDO. The studies would cover the following:

1. The present and potential sizes of markets, including extra-regional markets, for aluminium products in end-use sectors;

2. The barriers to increasing consumption within countries and regions, (inter alia, cultural, legal and administrative barriers should be addressed); assessment of the level and impact of import barriers (e.g. tariffs) in the main markets;

3. The measures necessary to encourage consumption;

4. The consumer acceptability of aluminium products;

5. The demand for aluminium products as consumer goods and as input into industries, including agriculture;

6. The competition from other materials - indigenous and imported;

7. The impact of infrastructural projects, such as in electrification, housing and transportation, on the demand for aluminium products;

8. A detailed quantification of capacities in semi-fabricated and fabricated facilities within individual countries and regions, in order to assess the ability to meet current and prospective demand;

9. An assessment of the net socio-economic benefit of using different sources of supply and different types of aluminium raw materials, i.e. primary and secondary, for the production of aluminium goods; incorporating an assessment of the extent of intra-regional cooperation in sourcing bauxite, alumina, primary and secondary aluminium;

10. An assessment of suitable locations for aluminium fabricating facilities;

11. An assessment of the necessity for, and the required extent of, government and other assistance e.g. IFC, in setting up fabricating facilities;

12. The cost competitiveness of fabricating facilities in individual countries and regions;

13. The sources of finance and technical assistance available for setting up and operating fabricating facilities;

14. The availability of skilled workers and the need for and availability of training programmes for the work force;

15. The income, employment and the linkage effects involved in setting up and operating fabricating facilities in countries and regions.

10. The IBA Secretariat recognized that the scope of work outlined above was extremely broad in terms of both its proposed geographic coverage and the subject areas to be covered. Having regard to the limited amount of funds available to the Secretariat, as well as to staffing limitations, it was decided to adopt a strategy for undertaking the study which reduced it to manageable proportions, took full advantage of resources available to the United Nations collaborators, and paid due attention to the particular expertise possessed by the three organizations: IBA, UNCTAD and UNIDO.

11. Accordingly, four basic regions were distinguished viz. the Caribbean, Latin and Central American regions; the West African region; the South Asian, Sout-East Asian and Pacific region; Oceania.

12. The key subject areas, with details, were distinguished as:

(a) The present and potential sizes of markets, including extra-regional markets, for aluminium products in end use-sectors

- Specify carefully the region to be tackled (see table 1 above) list subregions and countries;

- Present short demographic, geographic and economic profiles for each country within the particular region;

- Present annual data on domestic production, consumption, stocks imports and exports of aluminium products by end-use sectors for the countries, subregions and the region;

- Present trade flows in aluminium products between countries within and outside the region;

- Examine developmental programmes and projects, in particular infrastructural projects as in electrification, housing, irrigation, and transportation for individual countries, subregions and the region as a whole, so as to quantify the potential sizes of markets for aluminium products;

- Present a detailed quantification of capacities with current capacity utilization rates in semi-fabricated facilities within individual countries subregions and the region as a whole.

(b) Barriers to market access and barriers to increasing consumption within countries and regions; inter alia, trade barriers covering tariff and non-tariff barriers, cultural barriers, legal barriers, administrative barriers.

- Examine trade barriers, i.e. tariff and non-tariff barriers, existing within and outside the particular countries, the subregions and the region being covered (for example, the existence of a tariff in Japan against imports of aluminium products might impede market access of Australian aluminium products);

- Examine cultural, legal, administrative and other barriers to the use of aluminium products within and outside countries, subregions and the region as a whole; and,

- Propose measures to remove or reduce barriers to market access and to increasing consumption of aluminium production intra and extra regionally.

(c) Technical and economic matters concerning the setting up and operation of fabricating facilities

- On the basis of preliminary studies carried out by the Secretariat, the West African and South-East Asian and Pacific regions have been identified as likely to be deficient in semi-fabricating facilities in the medium term; the study should make an assessment of suitable locations for aluminium semi-fabricating and fabricating facilities having regard to the cost competitivensss of such facilities in individual countries and regions;

- Sources of finance, including finance from Government, and technical assistance available for setting up and operating fabricating facilities should be identified;

- The availability of skilled workers and the need for and availability of training programmes for the work force should be determined; and,

- The income, employment and the linkage effect involved in setting up and operating fabricating facilities should be assessed.

10. It was felt that subject area (a) would be handled principally by the IBA, subject area (b) principally by UNCTAD and subject area (c) principally by UNIDO. Both UNCTAD and UNIDO responded favourably to the outlined proposals of the IBA. UNCTAD indicated its willingness to assist in providing information generally but in particular on barriers to market access for aluminium products. UNIDO suggested that "the most appropriate programme would appear to be regional studies or pre-feasibility studies covering the West African region and the Sout-East Asian and Pacific region."

11. At its fifteenth session, held in Kingston in November 1988, the Council of Ministers of the IBA requested its Chairman "to contact West African countries in order to enlist their support in getting the Secretariat's study on promotion of aluminium consumption included in the 1990 UNIDO Work Programme, and in this connection, the Secretariat was requested to prepare the appropriate documentation to assist the Chairman".

12. After taking advice from UNIDO, the Secretariat suggested that the Chairman of the Council seek the adoption of the study by UNIDO as a project not necessarily tied to the Work Programme of UNIDO.

13. At its seventeenth session held in Kingston, in November 1990, the outgoing Chairman of the Council reported that an application had been submitted to the UNDP, specifically the United Nations Centre for Transnational Corporations (UNCTC). The approach had to be made to UNDP and not UNIDO. Furthermore, it was necessary to obtain a mandate from at least two countries in the sub-region - this was done on 5 January 1990 by Ghana and on 2 July 1990 by Sierra Leone. The Secretariat was requested to contact

UNCTC to see how the study could be undertaken. The Secretariat has been informed by UNCTC that it is proceeding to invite consultants to make proposals for undertaking the study.

## IBA'S ROLE IN PROMOTING ALUMINIUM CONSUMPTION

14. The possible actions which the IBA might consider in promoting aluminium consumption and encouraging downstream processing facilities in member countries are:

- Encourage research and development of specific aluminium products, which have greater utility in developing countries;

- Foster solutions to the bottlenecks which limit the traditional aluminium products from gaining further market share in the developing countries;

- Foster marketing oriented dialogue with consumers in the "old" as well as the "new markets with a view to better understanding the obstacles which aluminium products encounter in these markets;

- Endeavour to persuade national governments of member countries to consider possible changes in government policies, (such as trade and import restriction policies; relatively high import duties for aluminium semis), which would encourage further use of the metal;

- Foster joint involvement in market related studies with other international organizations, such as UNCTAD and UNIDO, in order to be better informed about those sectors in certain regions (e.g. Caribbean, African, Asian) in which aluminium could possibly find further applications; and,

- Make relevant market and technological information on downstream processing of aluminium available to the appropriate government agencies in member countries for further national and regional action.

## NOTES

1/ Some work had been done in 1983 and presented in a paper entitled "Expansion of Aluminium Use - 1. Preliminary Report on the Present Situation and Prospects", IBA/EB/XXVII/21/83.

2/ Estimated 1990 aluminium consumption levels of selected countries are presented in table 1. The IBA grouped selected countries into four broad regions, viz. Caribbean, Latin and Central America; West Africa; South Asia, South-East Asia and Pacific; Oceania.

INTERNATIONAL BAUXITE ASSOCIATION
ASSOCIATION INTERNATIONALE DE LA BAUXITE

# THE CURRENT STATE OF THE BAUXITE/ALUMINA/ALUMINIUM INDUSTRY AND SHORT-TERM MARKET OUTLOOK

(Prepared by IBA Secretariat for UNCTAD Meeting of Bauxite Producers and Consumers

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# THE CURRENT STATE OF THE BAUXITE/ALUMINA/ALUMINIUM INDUSTRY AND SHORT-TERM MARKET OUTLOOK

(Prepared by IBA Secretariat for UNCTAD Meeting of Bauxite Producers and Consumers


## ABSTRACT

Due to the supply/demand imbalance for primary aluminium, the market softened during the second half of last year and prices declined. Demand was lower than expected because of the recessionary circumstances in the U.S.A. and U.K. and due to the many economic/political uncertainties surrounding the Gulf Crisis.

The end of the Gulf War has not improved the position of the metal since the U.S. and U.K. are still in recession. Prices have remained low at 70-71 c/lb and are not expected to improve much during the year, due to the additions to world smelting capacity. The current cost/price ratio is not very favourable, and costs in some major metal producing countries such as the U.S.A. could go up in the near future, due to the strict enforcement of certain environmental regulations. Stocks in day's consumption are high. If the economic situation improves, 1992 should be a better year for the industry.

The alumina market is currently also quite soft due to an over-supply situation and increasing stocks. The spot price has declined to around US$195-200/tonne and is likely to remain at those levels for the rest of the year. Some improvement of the market is expected by next year as the demand for primary aluminium takes off.

The market for traded bauxite is currently in better shape than that for alumina. However, due to additional output from Brazil, Venezuela and Guyana during the year, the bauxite market could become softer by the end of this year, and remain in that position during 1992 as well.

The general consensus in the industry is one of a bearish outlook for the rest of the current year and part of 1992. Substantial improvements are expected as of 1993.


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# THE CURRENT STATE OF THE BAUXITE/ALUMINA/ALUMINIUM INDUSTRY AND SHORT-TERM MARKET OUTLOOK

(Prepared by IBA Secretariat for UNCTAD Meeting of Bauxite Producers and Consumers

## I. INTRODUCTION

This document contains an analysis of the current situation of the world bauxite/alumina/aluminium industry and provides a short term market outlook as envisaged by the Secretariat of the International Bauxite Association.

The paper starts with a brief overview of international developments, as the industry, being a part of the world economy is directly influenced by international macro-economic developments. This economic overview is followed by a systematic analysis of the market situation of primary aluminium, focussing attention on issues such as consumption, production, stock movements, prices, costs of production etc. In ensuing chapters, the market situation of alumina and bauxite is presented more or less along similar lines.

Finally, we present a short-term outlook scenario for the three stages of the industry.

## II. INTERNATIONAL DEVELOPMENTS

### II.1 Economic Outlook

Since late last year, the economies of at least four major OECD countries, i.e. U.S.A., U.K., Canada and Australia have been experiencing substantial difficulties. These economies, and in particular the first two, are currently in a clear state of recession. While there are some conflicting views about the severity and extent of the current recession, the IBA Secretariat concurs with those who argue that this downturn is primarily of a cyclical nature and that signs of economic recovery are likely to start showing by the second half of the current year. Given the recent pursuit of appropriate monetary policies and the exercise of fiscal discipline by the major OECD economies, such an outlook seems quite reasonable.

In the Secretariat's view therefore, the latest short-term economic growth forecasts published by Consensus Economics seem quite realistic at this stage (1). These forecasts along with pre-Gulf war forecasts made by the OECD are set out in table 1.

---

(1) Forecasts based on the averages of 170 independent analysts published in "The Economist", January 26, 1991

Table 1

Forecasts of Real GNP/GDP Growth Rates 1990, 1991 and 1992

(% change from previous year)

| Country | Forecast by Consensus Economics published January 1991 | | OECD Forecast published December 1990 | | |
|---|---|---|---|---|---|
| | 1991 | 1992 | 1990 | 1991 | 1992 |
| USA | -0.4 | 2.5 | 1.0 | 0.9 | 1.9 |
| Japan | 3.6 | 3.8 | 6.1 | 3.7 | 3.8 |
| Germany | 3.0 | 2.9 | 4.2 | 3.0 | 2.6 |
| France | 2.4 | 2.6 | 2.5 | 2.3 | 2.6 |
| Italy | 1.8 | 2.6 | 2.6 | 2.4 | 2.7 |
| U.K. | -0.2 | 2.1 | 1.6 | 0.7 | 1.9 |
| Canada | -0.4 | 2.9 | 1.1 | 0.9 | 2.3 |
| Australia | 1.0 | 2.7 | 2.2 | 2.3 | 2.3 |
| Belgium | 2.6 | 2.7 | 3.5 | 2.3 | 2.6 |
| Netherlands | 2.4 | 2.7 | 3.0 | 2.0 | 2.3 |
| Spain | 2.7 | 3.4 | 3.5 | 2.7 | 3.0 |
| Sweden | -0.2 | 1.3 | 0.9 | -0.5 | 0.8 |
| Switzerland | 2.1 | 2.3 | 2.5 | 2.0 | 1.8 |

Source: The Economist, January 16, 1991 and
OECD Economic Outlook, No. 48, December 1990

The table suggests that the U.S.A., U.K. and Canada which are currently in a state of recession will grow out of this situation by the end of the year and should experience relatively healthy growth rates in 1992. The economies of other major OECD countries such as Japan, Germany, France, while experiencing a decline in their respective growth rates compared to the situation in previous years, continue to be in good shape and should remain healthy.

The state of the U.S. economy is of particular interest to us, since the U.S. is the largest single market for aluminium products. The current recession is being reflected in a notable drop in US aluminium consumption. The hardest hit are the automobile and the housing sectors, two main consumers of the metal (1). Also of interest is the position of the U.S. dollar vis-á-vis the other major currencies in the world. It may be noted that the current weak U.S. dollar is contributing to inflationary pressures in the U.S.A., but has improved the competitiveness of U.S. products abroad and has served to boost U.S. exports including exports of aluminium mill products.

## I.2 Oil Prices

The invasion of Kuwait by Iraqi forces in August last year resulted in a temporary steep rise of oil prices on the world markets, reaching levels of around US$40 per barrel. This price upsurge was not supported by market fundamentals, but was the effect of psychological factors influencing the market. Loss of output from Iraq and Kuwait was filled quite swiftly with increases from other oil producers, notably Saudi Arabia, where production was boosted from 5.3 million barrels per day (mbd) to a massive 8.5 mbd by December of last year.

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(1) According to the World Bank, residential construction in the U.S.A. will decline by 7.6% in the current year, but should rise by 9.8% during 1992.

This massive increase in output along with the existence of high oil stocks in the main consuming countries and in floating storage, the release of strategic stock reserves by IEA member countries, several measures to cut oil demand, and the impact of lower economic growth rates on oil requirements have resulted in a notable drop in the price of crude oil on all world markets. The end of the Gulf war has served to put additional pressure on the price of crude oil.

While industry observers think that it may take Kuwait as long as two years or longer to repair its burning oil wells, this country's production could reach some 250,000 to 400,000 barrels per day by the end of the year while Iraq could also start exporting some crude around that time, provided it gets access to its outlet pipelines which are now controlled by allied forces.

Oil prices should therefore remain under pressure during this year with estimates of the average price ranging between a low of US$17 per barrel to an upper level of US$20 per barrel.

However, if by next year production in Saudi Arabia remains at 8.5 mbd and the majority of oil wells in Kuwait and Iraq are brought to life again, then one can see prices dropping even further due to an expected glut of oil. Prices could drop to lower than US$14 per barrel on the basis of the expected

market fundamentals but may not be allowed to remain at that level for long. The expectation is that politically such a low price will not be acceptable to either the producers of crude, or the consumers (1) . Thus, it is expected that all efforts will be made by OPEC and consuming governments to stabilize the price near to US$20 per barrel in 1992 as well, with current forecasts ranging between US$18-$19 per barrel for the year (2). This analysis suggests that the oil market will be a very controlled one for the months to come, and that prices in general should hover between US$17-US$20 per barrel during the coming 18 to 20 months.

---

(1) Erratic movements of oil prices affect the economic stability of consuming countries, while some major consuming nations partly supplied from indigenous sources would not want to jeopardize the viability of their own operations.

(2) At its first post-Gulf war meeting held on March 11-12 the OPEC explored possibilities to cut daily crude output by at least 1 million barrels. The market saw in this clear signs of the organization's viability. Consequently, upon this announcement, the North Sea Brent price rose by US$1 per barrel to US$19.50. Analysts indicated that the interest of the largest OPEC producer Saudi Arabia is not served by too high crude prices because:

    (1) Saudi Arabia does not want to encourage new entrants to the oil market;
    (2) that nation's foreign industry investments benefit from relatively low and stable crude prices

Such price outlook for crude oil should be some consolation to alumina producers, expected to operate in a soft market during the coming months, since Bunker C prices should be at favourable levels for this stage of the industry. This price outlook for crude oil should also serve to support a more meaningful recovery of economies worldwide and in the OECD countries in particular (1).

---

(1) According to the OECD, every $3 per barrel fall in oil prices leads to a ¼% p.a. increase in real GNP in the OECD countries

## III. THE STATE OF THE PRIMARY ALUMINIUM MARKET

### III.1 Supply/Demand Balance

During 1990, western world primary aluminium production was some 40 kt* short on total demand. However, imports from Eastern European countries exceeded this amount by around 100 kt, causing a slight over-supply situation for the year. Most of this excess supply seems to have occurred during the fourth quarter of last year, when western world production continued to increase, while demand stagnated, due mainly to the recessionary environment in the U.S.A. and U.K. and because of the uncertainties surrounding the Gulf crisis at that time. There are ample reasons to believe that the over-supply situation will not abate during at least the first two quarters of the current year.

### III.2 Consumption

As can be gleaned from table 2, consumption of primary aluminium during 1990 was marginally higher than in 1989. This almost stagnant consumption level came about mainly because of the economic difficulties in some of the major aluminium consuming countries and the previously mentioned uncertainties related to the military crisis in the Gulf since the third quarter last year.

---

*Kt = Kilotonnes or 1000 tonnes

Because of these problems, consumers of the metal adopted a "wait and see" attitude, with order bookings plunging during the fourth quarter of last year.

Overall, the market was in a bearish mood at the start of the new year and the outbreak of the Gulf war had further aggravated market sentiments. At least for the time being, demand is expected to remain sluggish despite the ending of the war. Consumption should recover later in the year, assuming that the post-war period continues to be characterized by relatively low oil prices and signs of worldwide economic recovery later in the year.

Right now, the main consuming country, i.e. the U.S.A. is in recession. The country's automobile and construction industries - albeit not major consumers of primary aluminium - are in the doldrums and likely to stay there for the months to come (1). Most of the U.S.A.'s excess metal supply is being exported to Japan where demand continues to be strong. These exports - supported by the weak U.S. dollar - have been a welcome outlet for U.S. producers under the current weak national market conditions.

---

(1) The average aluminium content of U.S. automobiles has increased from 130 lbs in 1980 to an estimated 165 lbs in 1991. Some 85% of this is secondary material

Table 2

Estimated Western World Supply/Demand Balance of Primary Aluminium 1989/1990 (kt)

| | 1989 | 1990 | % change | Jan. 1991 |
|---|---|---|---|---|
| Demand (real consumption) | | | | |
| U.S.A. | 4360 | 4293 | - 1.5 | 356 |
| Japan | 2158 | 2290 | + 6.1 | 197 |
| France | 686 | 686 | + 0.0 | 62 |
| Germany | 1290 | 1304 | + 1.1 | 130 |
| Italy | 607 | 624 | + 2.8 | 56 |
| U.K. | 455 | 447 | - 1.8 | 39 |
| Others | 5061 | 4989 | - 1.4 | 430 |
| Total Demand | 14617 | 14630 | + 0.09 | 1270 |
| Supply | | | | |
| Production | | | | |
| U.S.A. | 4025 | 4054 | + 0.7 | 351 |
| Canada | 1562 | 1563 | + 0.1 | 140 |
| Europe | 3948 | 3926 | - 0.6 | 325 |
| Oceania | 1501 | 1498 | - 0.2 | 126 |
| Latin America | 1698 | 1782 | + 4.9 | 163 |
| Others | 1730 | 1775 | + 2.6 | 157 |
| Total Production | 14464 | 14598 | + 0.9 | 1262 |
| Net Imports | 184 | 143 | | 24 |
| Total supply | 14648 | 14741 | + 0.6 | 1286 |

Source: CRU and IBA estimates

## III.3 Production

Output at the smelting stage of the industry has continued to grow, despite indications of weaker demand. For the fourth quarter in 1990, production is estimated to have increased by 1.8% to 3734 kt compared to third quarter output (1).

The IBA Secretariat estimates that some 500 kty of brownfield, greenfield and restarted capacities were added during the last quarter of 1990. This additional capacity was not fully utilized during the start-up period but should reach a high utilization rate during the first half of the current year. During this same period, an additional 290 kty* capacity is expected to come on stream. The few closures and cutbacks which have taken place during the period, total 115 kty. No other cutbacks are envisaged for now. From this analysis, it is quite clear that western world output will continue to increase for the months to come. Thus, while demand continues to be stagnant, production is high and increasing. Stock levels are therefore expected to rise. The only consolation is that net exports from the traditional Eastern European suppliers to the western world are not expected to increase much in the short term due to the many technical difficulties being faced by the industry in these countries.

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(1) Fourth quarter 1990 western world output was up 3.1% from a year ago compared to an increase in consumption by just 0.5%

* = Kilotonnes per year

## III.4 Stock Movements

Latest data indicate that producers' stocks have increased by some 130 kt during Q4 1990 while LME stocks rose around 180 kt over the same period. By the end of January, producers' stocks amounted to 1564 kt compared to 1539 kt by the end of December while LME stocks had come down to 301.15 kt over the same period, a modest decline from the 310.6 kt recorded at the end of last year. This 9.45 kt decline in LME stocks came about due to increased Japanese buying by end January combined with some short covering by traders.

As indicated in table 3, producers' stocks stood at 39.5 days consumption by end-December last year, still lower than the result a year before. Stocks are expected to reach 43.3 days consumption by the end of the first quarter and 48.3 days by end of Q2.

Industry analysts now think that a stock level at 40 days' consumption should be considered close to a "normal" level in today's industry environment with its highly computerized stock management features.

The IBA Secretariat's estimates therefore suggest that primary stocks will be substantially higher during the first two quarters of this year compared to what is now considered as "normal" levels.

Table 3

Consumption and Producers' Inventory of Aluminium 1989-1991
(kt at end of quarter)

| | Consumption | Producers' Stocks (at end of quarter) | Days Stocks (1) |
|---|---|---|---|
| 1989 Q1 | 3656 | 1515 | 37.8 |
| Q2 | 3732 | 1510 | 36.9 |
| Q3 | 3684 | 1592 | 39.4 |
| Q4 | 3545 | 1576 | 40.6 |
| 1990 Q1 | 3631 | 1552 | 39.0 |
| Q2 | 3706 | 1485 | 36.6 |
| Q3 | 3737 | 1409 | 34.4 |
| Q4 | 3556 | 1539 | 39.5 |
| 1991 Q1(E) | 3560 | 1690 | 43.3 |
| Q2(E) | 3570 | 1890 | 48.3 |

Note - (1): Producers include smelters and integrated semi-fabricators. Days stocks are calculated as stocks at end of quarter/ consumption per day

(E): IBA estimate

Source: IPAI, CRU, IBA

### III.5 Prices

The slight over-supply situation on the primary aluminium market has clearly placed downward pressure on the metal price since the latter part of last year, with the LME cash

price dropping from an average of 93.7 c/lb* in September 1990 to just over 69 c/lb in December. Due to additional supply of metal in LME warehouses and low buyers' activity on the terminal market at the start of the new year, prices remained depressed with the LME cash price averaging 68.7 c/lb in January and falling marginally to 68.3 c/lb in February (see Table 4). Although the overall market fundamentals are not the only factors determining price movements on the terminal market, i.e. the LME, it is generally accepted that these movements are reasonable indications of the status of the supply/demand situation in the industry (1).

During the Gulf war, consumer confidence was quite subdued and placement of new orders was very low. The post-war period has not shown any renewed enthusiasm by consumers of the metal apart from some new orders being placed by Japanese offtakers. Thus industry observers see fundamentals as relatively weak and expect the price to remain around 69 c/lb for the time being, while a temporary drop of the LME cash price to below 65 c/lb is not being ruled out.

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(1) It may be noted that from a seller's point of view, the LME offers several hedging tools against possible price declines of the metal and its raw material. In this connection, it is interesting to know that the total turnover of aluminium on the LME amounted to an excess of 99 million tonnes in 1990.

*C/lb = US cents per pound

Under the current market conditions, the major North American companies have lowered their March delivery prices for ingot to 71 c/lb, down 0.5 c/lb from January delivery prices. One quite interesting development is the decision by Alcan to allow its customers to choose between two different ingot prices for March and April offtakes. In addition to the company's transaction price, customers can opt to pay for offtakes at the monthly average of the Metals Week U.S. Transaction price, a month prior to the month of shipment. Some industry observers feel that this move towards market-based pricing can be a significant and long-lasting deviation from traditional company transaction pricing methods.

TABLE 4

LME CASH PRICE FOR PRIMARY ALUMINIUM INGOT
(US CENTS/LB.) (1)

| End of month | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| January | 85.82 | 65.67 | 50.44 | 48.89 | 70.22 | 48.78 | 50.77 | 53.12 | 91.3 | 109.75 | 69.32 | 68.73 |
| February | 98.89 | 65.88 | 54.71 | 55.84 | 68.72 | 49.81 | 50.60 | 58.22 | 98.3 | 99.40 | 65.97 | 68.25 |
| March | 87.73 | 65.27 | 48.08 | 59.01 | 67.72 | 49.68 | 52.98 | 62.00 | 114.6 | 94.06 | 71.10 | |
| April | 89.36 | 64.30 | 45.04 | 61.62 | 64.27 | 50.18 | 52.82 | 63.55 | 113.9 | 96.42 | 69.20 | |
| May | 81.19 | 59.08 | 43.41 | 65.85 | 59.19 | 50.18 | 52.84 | 64.03 | 137.0 | 102.43 | 69.26 | |
| June | 82.10 | 56.29 | 41.32 | 67.09 | 57.04 | 46.82 | 53.66 | 66.70 | 164.9 | 86.83 | 71.03 | |
| July | 78.36 | 52.39 | 43.44 | 67.18 | 52.07 | 45.92 | 50.94 | 74.89 | 117.1 | 79.65 | 71.26 | |
| August | 81.39 | 55.25 | 43.48 | 70.67 | 52.73 | 46.19 | 51.22 | 82.12 | 122.5 | 81.16 | 80.83 | |
| September | 77.09 | 53.21 | 43.13 | 73.76 | 45.80 | 44.60 | 54.70 | 79.21 | 108.3 | 77.93 | 93.74 | |
| October | 73.94 | 51.80 | 43.13 | 73.76 | 45.80 | 44.60 | 54.70 | 89.03 | 104.8 | 82.56 | 88.26 | |
| November | 71.10 | 48.49 | 43.92 | 69.63 | 52.25 | 43.10 | 51.34 | 76.25 | 103.5 | 78.75 | 73.40 | |
| December | 65.09 | 50.44 | 44.70 | 71.26 | 49.68 | 47.20 | 51.02 | 82.70 | 103.4 | 74.08 | 69.06 | |
| Year average | 79.39 | 57.34 | 45.40 | 65.38 | 57.19 | 47.26 | 52.30 | 70.99 | 115.0 | 88.51 | 74.36 | |

Note (1): Jan. 1979 - Dec. 1988 LME cash price for 99.5% purity ingot
As of Jan. 1989 LME cash price for 99.7% purity ingot

Source: Metals Week

III.6 Cost of Production

Smelter operating cost estimates listed in table 5 below, clearly show that these have increased over the past months for almost all companies. In an environment of weakening alumina and ingot prices the opposite would have been more plausible, since it is expected that a lower metal price results in lower metal-indexed power charges at certain smelters. However, such indexation of power costs to the price of metal only applies to certain smelters in North America (BPA, TVA and Quebec area) and partly in Ghana (1). Some other smelters in regions such as Europe, Brazil and Australia (Portland smelter) receive their power at concessional rates.

Therefore, the main explanation for these smelters cost increases are:

(1) the effect of the reopening during 1990 of some high-cost potlines;

(2) the overall effect of inflation on "other" inputs primarily caused by the temporary increase of oil prices around August last year;

(3) the effect of the low value of the U.S. dollar on dollar denominated costs at primarily the European smelters.

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(1) In the U.S.A. some 45% of smelting capacity is supplied under variable power agreements

Table 5

Operating Cost of Aluminium Smelters
(January 1990 and January 1991)

| Company/Country | Estimated O.C. Jan. 1990 (c/lb) | Estimated O.C. Jan. 1991 (c/lb) | % Change |
|---|---|---|---|
| Alcan | 58 | 59 | + 1.7 |
| Alcoa | 59 | 62 | + 5.1 |
| Alumax | 61 | 61 | 0.0 |
| Alusuisse | 73 | 80 | + 9.6 |
| Comalco | 59 | 59 | 0.0 |
| Hydro Al. | 67 | 71 | + 6.0 |
| Kaiser Tech. | 68 | 67 | - 1.5 |
| Pechiney | 63 | 66 | + 4.8 |
| Reynolds | 62 | 62 | 0.0 |
| VAW | 64 | 69 | + 7.8 |
| Australia | 54 | 55 | + 1.9 |
| Brazil | 55 | 64 | +16.4 |
| Canada | 53 | 53 | 0.0 |
| France | 66 | 71 | + 7.6 |
| Germany | 71 | 77 | + 8.5 |
| Italy | 71 | 78 | + 9.9 |
| Japan | 55 | 58 | + 5.5 |
| Norway | 66 | 71 | + 7.6 |
| Spain | 68 | 75 | +10.3 |
| U.K. | 59 | 66 | +11.9 |
| U.S.A. | 65 | 66 | + 1.5 |
| Venezuela | 46 | 47 | + 2.2 |

Source: Anthony Bird Associates

The substantial cost increases experienced by the European companies, i.e. Alusuisse (+9.6%), Hydro Aluminium (+6.0%), VAW (7.8%) and Pechiney (+4.8%) whose smelter operations are concentrated in this part of the world are therefore no surprise.

The Secretariat estimates that the required price by the "average smelter" to cover these operating costs, capital charges, and earn a reasonable return on equity would be around 78.5 c/lb.

Under the current market prices, i.e. LME spot around 65-69 c/lb and company transaction prices at 71 c/lb many smelters are barely covering their operating and capital costs (i.e. total costs). This situation could ease up somewhat during the second half of the year in the event of a slight improvement in metal prices and a possible decline of alumina input costs. However, in the case of the U.S.A., certain proposed environmental regulations could mean additional costs at smelters.

## IV. THE STATE OF THE ALUMINA MARKET

### IV.1 Introduction

Despite increased requirements at smelters for metallurgical grade alumina (MGA), the market started to weaken by the second half of 1990, since supply exceeded demand. The end result of this supply/demand imbalance was the rise in alumina stocks by more than one million tonnes during the year. This situation has continued in the new year resulting in a downward pressure on alumina prices. While the short-term outlook for the MGA market is certainly not bullish, no distress sales are taking place. Thus, while the great times experienced by alumina suppliers in late 1988 and during 1989 are over for now, the depressed market situation of 1985/86 is certainly not envisaged at this time. The current softness of the alumina market is seen as a temporary market phenomenon which should start correcting itself by the end of the year, depending on the situation on the ingot market.

The longer term market outlook for MGA as seen by some industry analysts remains bearish to some extent, mainly because of fears that net exports to the Eastern countries may decline due to the inability of these countries to pay for the alumina. However, this sentiment is not shared by most executives of alumina producing and selling companies in the western world who feel that there is substantial scope for increased future supplies of this material to those countries.

## IV.2 Production of Alumina

As shown in table 6, production of MGA in 1990 increased by some 1.3 million tonnes compared to 1989 output levels. The largest increase in production was recorded in Latin America (+848 kt) followed by Oceania (+366 kt).

It is of interest to note the jump in output during the second half of last year, when MGA production increased to 15704 kt from 15156 kt recorded in the first half of the year.

Production during the current year is expected to increase further by at least 1 million tonnes, a substantial proportion of which may be added to stocks.

Table 6

Estimated Regional Alumina Production in the Western World
1989-1990 (kt)

| | Africa | North Amer.* | Latin Amer.* | East & S. Asia | Europe | Oceania | Total |
|---|---|---|---|---|---|---|---|
| 1989 | | | | | | | |
| MGA (I) | 626 | 5129 | 6330 | 1623 | 5183 | 10668 | 29559 |
| Non-MGA | - | 813 | 317 | 870 | 1063 | 155 | 3218 |
| Total | 626 | 5942 | 6647 | 2493 | 6246 | 10823 | 32777 |
| 1990 | | | | | | | |
| MGA (II) | | | | | | | |
| 1st H | 314 | 2622 | 3509 | 692 | 2590 | 5429 | 15156 |
| 2nd H | 328 | 2642 | 3669 | 817 | 2643 | 5605 | 15704 |
| Non-MGA | | | | | | | |
| 1st H | - | 418 | 114 | 432 | 563 | 98 | 1625 |
| 2nd H | - | 366 | 113 | 460 | 551 | 98 | 1588 |
| Total | 642 | 6048 | 7405 | 2401 | 6347 | 11230 | 34073 |
| (II)-(I) | 16 | 135 | 848 | -114 | 50 | 366 | 1301 |

Source: IPAI and IBA

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* Amer. = America

## IV.3 Stocks of Alumina

Stock movements of MGA are set out in table 7 below. Expressed in days' consumption of MGA at western world aluminium smelters, today's stock levels are not too far from those at the beginning of the last decade. This is not a very encouraging sign. The Secretariat's analysis suggests that this situation will not improve in the current year. In fact, there are ample signs on the alumina market which indicate that MGA stock may increase this year by an additional 0.6-0.7 million tonnes. This precarious situation is expected to start improving in 1992 to some extent, with rising demand at greenfield non in-situ smelters such as Dunquerque, Alouette and Deschambault and at the many in-situ smelters in Brazil, Venezuela and Australia now undergoing brownfield expansions, while exports to the Eastern countries such as the U.S.S.R. and China are also expected to rise. This improvement on the MGA alumina market is not likely to suffer much from the brownfield expansions in the pipeline at alumina refineries in Latin America and Australia.

Table 7

Estimated Change in MGA Stocks in the Western World
1989-1991 (Q1 & Q2)

| Quarter | | MGA prod.(1) | Ingot prod.(2) | MGA equivalent (3) | Apparent change in MGA stocks | Total stocks MGA (4) |
|---|---|---|---|---|---|---|
| 1989 | Q1 | 6755 | 3563 | 6948 | -193 | 4372 |
| | Q2 | 7123 | 3620 | 7059 | + 64 | 4436 |
| | Q3 | 7336 | 3640 | 7098 | +238 | 4674 |
| | Q4 | 7381 | 3641 | 7099 | +282 | 4956 |
| Total | 1989 | 28595 | 14464 | 28204 | | |
| 1990 | Q1 | 7402 | 3583 | 6987 | +415 | 5371 |
| | Q2 | 7334 | 3608 | 7036 | +298 | 5669 |
| | Q3 | 7458 | 3668 | 7153 | +305 | 5974 |
| | Q4 | 7675 | 3734 | 7281 | +394 | 6368 |
| Total | 1990 | 29869 | 14598 | 28457 | | |
| 1991 | Q1(E) | 7705 | 3809 | 7428 | +277 | 6645 |
| | Q2(E) | 7892 | 3885 | 7576 | +316 | 6961 |

Source: Derived from IPAI and EAA data by IBA

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Notes: (1) IPAI production including Yugoslav output less net exports to Eastern countries

(2) CRU data (incl. Yugoslavia)

(3) MGA consumption factor (1.95)

(4) End of year 1988 MGA stocks were 4565 kt.

(E) = IBA estimates

## IV.4 Operating Costs

In retrospect, the temporary hike in the price of crude oil at the start of the Gulf crisis seems to have had minimal effects on the operating cost at most alumina refineries. Only those entirely run on fuel energy such as the refineries in Jamaica saw a temporary increase in their costs, stemming from increased oil prices. One major reason for this relatively mild effect on alumina cost was the fact that prices of bunker C oil lagged behind those of crude oil. Thus, bunker C prices did not move in tandem with the price of crude, and in fact remained relatively low.

As shown in table 8, operating costs in Q4 1990 increased very marginally compared to those in the third quarter, and actually declined slightly in the case of Australia where the refineries are now less dependent on imported oil and also because of a weaker Australian currency. The marginal increase in costs during the first quarter of the current year is based on a slight strengthening of the Australian dollar vis-á-vis the U.S. currency.

Costs at other refineries are also expected to increase somewhat in the first quarter due to the increase in the price of caustic soda which may be only partly offset by slightly lower oil prices.

Table 8

Prices and Operating Costs of Alumina 1989-1991
Q1 (US$/t)

| | Average Operating cost (US$/t) W.W. | Australia | Average contract price (FOB) | Spot price (FOB) | Spot/LME (%) (1) |
|---|---|---|---|---|---|
| 1989 | 149 | 135 | 258 | 544 | 28.4 |
| Q1 | 150 | 135 | | 633 | 28.9 |
| Q2 | 148 | 131 | | 600 | 29.8 |
| Q3 | 148 | 134 | | 483 | 27.6 |
| Q4 | 149 | 139 | | 458 | 26.9 |
| 1990 | 155 | 136 | 270 | 293 | 18.0 |
| Q1 | 151 | 140 | | 400 | 26.2 |
| Q2 | 150 | 131 | | 310 | 19.9 |
| Q3 | 158 | 136 | | 243 | 13.5 |
| Q4 | 160 | 135 | | 220 | 13.3 |
| 1991 Q1(E) | 164 | 136 | 225-250 | 190-200 | 12.9 |

(E) IBA estimates

(1) Spot price of alumina as percentage of the 3-months forward quote for primary aluminium on the LME

Source: IBA Secretariat and J.F. King

The caustic soda input cost seems to have become a major problem for many alumina refineries which depend on outside sources for their supplies of this chemical. Thus, the spot price has increased from around $290/tonne (FOB) in Q4 1989 to $355/tonne (FOB) in Q4 1990, while contract prices have increased

from $255/tonne (FOB) to $280/tonne (FOB) over the same period (1). Contract prices have increased by some $10/tonne during the first two months of the current year. Spot prices have hovered around the Q4 1990 price levels.

These increases in prices were not only the result of the uncertainties on the oil market, but basically because of capacity limitations in the chlore-alkali industry (2).

## IV.5 Prices

The overall development on the world alumina market during 1990 was influenced by increasing stock levels. Spot prices therefore declined from a high of US$400/tonne at the beginning of the year to a low of US$220/tonne by the end of 1990 (see table 8).

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(1) In 1985, caustic soda was sold at prices as low as US$50/tonne FOB in the U.S. Gulf region.

(2) Because of strict environmental regulations in the USA and Western Europe, the chlore-alkali industry has been hampered in its capacity expansion programmes. Demand for the co-product chlorine is also sluggish because of the environmental concerns, resulting in higher prices being charged for caustic soda.

The position of the contract market was somewhat different. The average FOB export price of the largest alumina exporter namely Australia, actually increased by some US$20/tonne in 1990 compared to the 1989 average despite the increasing supply/demand imbalance on the market.

This increase of the Australian export-price was mainly the result of lag effects of market developments on the contract price of alumina. Thus, the high metal and alumina prices during 1989 had a boosting effect on the average Australian price. This resulted in higher CIF prices for material imported into the U.S.A. as well, and the average world CIF price as shown in table 13 was therefore also higher in 1990 compared to the 1989 average.

However, while long-term contract prices increased during 1990, the situation was quite different for one year or short-term contract prices. These declined from some $360/tonne at the beginning of the year to around $225/tonne by the end. Such short-term contract prices are likely to follow trends on the spot market as they are partly related to this market and usually indexed to the LME metal price.

## V. THE STATE OF THE BAUXITE MARKET

### V.1 Recent Developments

Due to increased output at certain bauxite mines such as Trombetas and Los Pijiguaos the tight situation on the bauxite market prevailing in 1989 seems to have eased somewhat during the second half of 1990. During the first half of the current year, the market for internationally traded bauxite is expected to be well balanced but later in the year some softening could occur due to further increases in production in Guyana, Brazil and Venezuela.

In Guyana, shipments of bauxite from the Aroaima mine started early this year; a month or two later than originally planned, due to heavy rainfall. The mine is expected to produce 1.5 million tonnes of very good quality trihydrate bauxite this year. The Secretariat understands that Reynolds, the co-owner of the mine, has signed a long-term delivery contract with Marc Rich.

In Suriname, the Moengo mine is expected to be depleted by the end of July this year. The new Coermotibo mine will become operational around that time and start supplying bauxite to the alumina refinery in Paranam. The deposits in the Coermotibo area are large enough to last 10-12 years before they

too are depleted. Meanwhile, work is in progress to open the new Accaribo mine, which is expected to become operational in 1992.

In Brazil, output at the Trombetas mine reached 8 million tonnes in 1990 and is expected to remain around that level this year. Some 62% of the output in 1990 was shipped within the region, equally divided between Alumar and Interalumina refineries in Brazil and Venezuela respectively.

Production at the Los Pijiguaos mine in Venezuela amounted to some 1000 kt in 1990. Output should reach at least 1.5 million tonnes in the current year as the infrastructural facilities are nearing completion. If the target level of production is reached this year, some small amounts of Trombetas bauxite could be replaced by Los Pijiguaos bauxite at the Interalumina refinery. This process will continue in the coming few years until Venezuela becomes entirely self-sufficient in bauxite (1).

From the point of view of bauxite exporters, some rather disturbing news is the decision by Alcoa and Billiton to go ahead with the development of their bauxite deposit in

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(1) Some bauxite from Sierra Leone may continue to be required to sweeten the local bauxite. It is understood that Sieromco bauxite is currently purchased for this purpose at a premium price from Alusuisse

Oroximina, Brazil. In principle, this new venture should be operational by late 1992, with an initial output of 2.2 million tonnes per year, to be mined by a new company called Alcoa Billiton Mineracao (60% Alcoa and 40% Billiton). The IBA Secretariat understands that Billiton will be the operator of the mine and that later in the decade, output will be increased as the expansion of the Alumar refinery - where the Oroximina bauxite will be processed - is put in place.

It may be noted that with the replacement of Trombetas bauxite at Alumar and at Interalumina, around 60% of that bauxite, or some 4.8 million tonnes, will have to find other markets by the second half of the decade. Even if the Alunorte refinery in Brazil is completed by then, there will be some excess bauxite available on the international market, as no new non in-situ refinery capacity is in the pipeline. The bauxite market could therefore become weaker around that time.

## V.2 Production

Preliminary data show that total bauxite production in the world was substantially higher in 1990 compared to 1989 output. As can be seen in table 9, western world production rose by 5% with highest increases recorded in Asia and Latin America while output in the Eastern countries was 3.2% higher in 1990.

In the current year, production in the Eastern Countries could decline as uneconomic mines in the U.S.S.R. and Hungary are closed. Output in the western world will increase with higher levels expected in Latin America (Brazil, Venezuela, Guyana), Caribbean (Jamaica) and Oceania (Australia).

Table 9

Estimated Bauxite Production 1989, 1990
(kt, regional basis)

| Region | 1989 | 1990 | % Change |
|---|---|---|---|
| North America | 744 | 558 | - 25% |
| Latin America | 24769 | 27314 | +10.3% |
| Europe | 7122 | 6816 | - 4.3% |
| Africa | 19402 | 19805 | + 2.1% |
| Asia | 5664 | 6317 | +11.5% |
| Oceania | 41938 | 43762 | + 4.3% |
| Western World | 99639 | 104572 | + 5% |
| Eastern Countries | 12097 | 12484 | + 3.2% |
| Total World | 111736 | 117056 | + 4.8% |

Source: J.F. King, World Capacity and Market Report, February 1991

## V.3 Prices

While most bauxite prices remained relatively high during the first half of 1990, substantial declines on the "spot market" were noticeable by the end of that year. Contract prices remained stable as can be seen in table 10.

The spot price of Boke bauxite was almost US$50/tonne FOB early last year, but has now declined to around US$34/tonne while Trombetas spot has declined from $49.50/tonne to $32/tonne over the same period.

The IBA Secretariat has been informed that the contract price of Trombetas bauxite has remained at $28.50 FOB for all customers, while negotiations are in progress to review this price. CVRD's position is that the price should go up by at least US$3-5/tonne whereas the other MRN partners are arguing for an actual price reduction. The Secretariat feels that under the current market conditions and the outlook for the remainder of the year, parties will agree to keep the price at the current $28.50/tonne FOB for this year and perhaps even for 1992. In any event, a price increase is not very likely.

While the Boke contract price has remained stable at $33/tonne FOB during 1990, this price is likely to decline to some extent in the current year, on account of lower ingot and alumina prices in 1990 compared to 1989 prices, and their impact on the pricing formula. The Boke contract price is expected to remain under pressure this year and even in 1992, when a new round of negotiations can be expected to revise the basic agreement which expires in July 1995.

In Sierra Leone, the government is seriously pursuing its negotiations with Sieromco, in order to obtain a better base price for this bauxite which will affect profitability of the operations and improve government earnings. The IBA Secretariat believes that the government will be successful in this undertaking.

Table 10

Estimated Price for Traded Bauxites
(FOB, US$/tonne)

| | 1989 | 1990 | | | 1991 |
|---|---|---|---|---|---|
| | H2 | H1 | Q3 | Q4 | Jan./Feb. |
| Spot Price | | | | | |
| Boke | 42 | 49.5 | 42 | 35.75 | 34 |
| Trombetas | 35 | 49.5 | 37.5 | 33.25 | 32 |
| Contract Price: | | | | | |
| Boke | 34 | 33 | 33 | 33 | 33 |
| Trombetas | 28.5 | 28.5 | 28.5 | 28.5 | 28.5 |
| Gove | 15 | 18 | 19.5 | 19.5 | 19.5 |
| Weipa | 14.5 | 17.5 | 19 | 19 | 19 |
| Guymine | 25 | 27.5 | 27.5 | 27.5 | 27.5 |
| Sieromco | 20 | 21.50 | 21.50 | 21.50 | 21.50 |
| KJBC (Jamaica) | 25 | 26.58 | 26.58 | 26.58 | 26.58 |

Source: CRU and IBA estimates

## VI. SHORT-TERM FORECASTS

### VI.1 Primary Aluminium

All indications point in the direction of very sluggish demand for ingot during the first two quarters of the year with some possibilities of initial improvements during the second half. Much will depend on the speed and force of economic recovery in the industrialised world.

The IBA Secretariat expects western world consumption for the year to remain close to 1990 consumption levels, and to improve in 1992 assuming a strong worldwide economic recovery by that time.

The current slump in demand for the metal will result in stock build-ups which currently are still at historically low levels. This means that prices should not come under further pressure this year and are likely to average around 70 c/lb for the year, improving to around 75 c/lb during 1992 (in nominal terms).

A more robust price improvement is not likely in the short term, since substantial amounts of greenfield and brownfield capacity have been commissioned since the second half of last year while very few cutbacks have been announced. Despite the relatively low metal price, producers have continued to produce at or above nameplate capacity. Although operating

rates at some smelters may be lowered in the course of the year as prices remain unattractive, no large closures are expected. Besides, lower alumina and energy charges may keep smelters in business despite a soft market for the metal. Thus, as can be seen in table 11, the Secretariat expects production to exceed consumption this year by at least 310 kt, but to be slightly lower than demand in 1992.

Table 11

Forecasts of Primary Aluminium Consumption and Production
(western world, 1991-1992 in kt)

| Forecast by: | | 1990 (estimates) | 1991 | 1992 |
|---|---|---|---|---|
| IBA Secretariat | C | 14650 | 14660 | 15250 |
| | P | 14570 | 14970 | 15200 |
| Consultant I | C | 14755 | 14762 | 15403 |
| | P | 14555 | 14714 | 14963 |
| Consultant II | C | 14722 | 14518 | NA |
| | P | 14562 | 15046 | NA |
| Consultant III | C | 14207 | 14593 | 15213 |
| | P | 14531 | 14895 | 15240 |
| Consultant IV | C | 14725 | 15250 | 15700 |
| | P | 14500 | 15850 | 15450 |
| Consultant V | C | 14803 | 14872 | 15643 |
| | P | 14581 | 15010 | 15428 |

One factor to keep in mind though is the possible increased inflow of Soviet metal to the western world markets. There are ample reasons to believe that this could happen in the medium term, resulting in an extended required time before the market improves. Despite the many technical and environmental problems faced by the Soviet smelters, supplies of metal to the western countries could be raised for the following reasons:

(1) the depressed national market;

(2) the freeing of metal due to the secession of barter-based arrangements between ex-Comecon member states;

(3) the need to earn hard currency.

In any event, the short-term outlook of the primary aluminium market is certainly not bullish.

## VI.2 Metallurgical Grade Alumina

The rising gap between supply and demand for MGA since the second half of last year has resulted in increasing stock levels and declining spot prices.

This situation is expected to continue in the current year with stocks rising by another 600-700 kt. While there seems

to be some need to replenish MGA stocks at smelter sites, many such smelters are currently not in a financial position to do so. While the integrated smelters can operate with very low levels of alumina stocks this is less possible for the so-called independent smelters. In any event stocks are increasing and currently some small amounts of spot material is available at prices below US$195/tonne. The theoretical operating rate at western world refineries is currently estimated at 92 per cent (see table 12).

Table 12

Actual and Forecasts MGA Requirement
1990-1992 (kt)

| Year | Primary aluminium production | MGA requirement | MGA requirement + net exports to Eastern countries | MGA capacity (4) | % utilization rate |
|---|---|---|---|---|---|
| 1990 | 14570 | 28412 (1) | 30860 (2) | 32237 | 95.7 |
| 1991 | 14970 | 29192 | 30392 (3) | 33002 | 92.0(5) |
| 1992 | 15200 | 29640 | 30860 (3) | 33527 | 92.1(5) |

Note: (1) Primary aluminium production x 1.95
(2) Actual MGA production in western world
(3) Net exports to Eastern countries estimated at 1200 in 1991 and 1220 in 1992
(4) Estimated start of year capacity
(5) Theoretical utilization rate

Some industry observers argue that if no cuts are realized this year in operating rates at existing refineries, spot prices may reach as low as $150/tonne. However, the IBA Secretariat expects that based on this bearish outlook, some of the brownfield expansions in Australia (Wagerup, Worsley, QAL) and in Latin America (Interalumina, Alumar, Jamalco) will be slowed down somewhat in order not to depress the market further down the road.

Based on this assumption, the IBA Secretariat argues that the alumina market will not experience any distress sales this year and that next year should show some signs of improvement. By that time, lower operating cost due to relatively low oil prices, should enable alumina refineries to enhance their financial position.

## VI.3 Bauxite

Currently the market for internationally traded bauxite is in fairly good shape. However, because of additional output being realized in Brazil, Guyana and Venezuela, this market could begin to experience some signs of weakness during the second half of the year. Apart from the impact of this additional supply on the market, there is also the effect of a lower base formula

price of Boke bauxite, due to the lower aluminium and alumina prices in 1990 compared to prices in 1989.

While the outlook is not bearish, more and more Trombetas or other bauxites being replaced at the Interalumina refinery will become available on the world market and will serve as a damper on bauxite prices. The bauxite market is therefore likely to remain relatively soft in 1992 as well, and prices to be under pressure also because of the expectations that the base contract price of Boke bauxite in that year will be lower than that in the current year, since alumina and metal prices this year will be below those realized in 1990.

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